
Space Weather Forecast

Issued on Sunday, 20 February 2022 at 12:28 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales <https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales>

Space Weather Forecast Headline: Chance of G1/Minor Geomagnetic Storms Day 1 (20 Feb), slowly declining. Slight chance throughout of Moderate-class flares.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low over the past 24 hours, with two Common class flares from over the NE limb. These are perhaps from a returning region which was a likely source of a notable far-sided flare and CME on the 15th. There are 3 Earth-sided sunspot regions, however these are all small and simple at the present time. A fourth region is rotating onto the NE limb, but this can't yet be analysed. There was an eruption in the southeast disc, which has produced a Coronal Mass Ejection (CME). This is expected to miss Earth. No other Earth-directed CMEs have been observed.

Solar Wind / Geomagnetic Activity: The solar wind showed the arrival of a fast wind from a coronal hole. The wind speed was initially slow near 350 km/s, but rose steadily until 20/0200 UTC and has been varying between 480-530 km/s since. The total magnetic field strength (IMF) was moderate, but fell back to weak after 20/0200 UTC. The north-south component was initially mainly southward directed, but became more northward directed after 20/0200 UTC. Geomagnetic activity was Quiet to Active (Kp 1-4), with a G1/Minor Storm (Kp 5) interval 20/0000-0300 UTC.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) has remained very slightly above background levels, but is gradually declining and well below the threshold for solar radiation storms. This was due to the large far sided flare from the region expected to rotate into view in the coming days.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is likely to be Low or Very Low at first, but with a slight chance of rising to Moderate due to the potential for flaring from one or more region (s) just starting to rotate onto the Earth-facing disc. The other three sunspot regions on the Earth-facing disc are currently unlikely to produce significant flares.

Solar Wind / Geomagnetic Activity: There are no Earth-directed CMEs. Earth is experiencing the fast wind from a coronal hole, with this expected to persist for 24-48 hours before gradually easing. Geomagnetic activity is expected to be Quiet to Active at first, with a chance of further G1/Minor Storm intervals. This is expected to steadily reduce through the next 24-48 hours, with mainly Quiet activity expected by Day 4 (23 Feb).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is expected to soon fall to background, with no solar radiation storms expected through the period.

Geomagnetic Storms:

Geo-Magnetic Storm	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Minor or Moderate	G1 to G2	Yes	30	20	5	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	No	10	10	10	10
Very Active	R3 to R5 X	No	2	2	2	2

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm ⁻² sr ⁻¹ s ⁻¹)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	1	1	1	1
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = cm⁻²sr⁻¹s⁻¹)